



IMPACT Mathematics

COURSE 3

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STANDARDS	PAGE REFERENCES
<p>Number & Operation</p>	
<p>Read, write, compare, classify and represent real numbers, and use them to solve problems in various contexts.</p>	
<p>8.1.1.1 Classify real numbers as rational or irrational. Know that when a square root of a positive integer is not an integer, then it is irrational. Know that the sum of a rational number and an irrational number is irrational, and the product of a non-zero rational number and an irrational number is irrational.</p> <p><i>For example:</i> Classify the following numbers as whole numbers, integers, rational numbers, irrational numbers, recognizing that some numbers belong in more than one category: $\frac{6}{3}$, $\frac{3}{6}$, $3.\bar{6}$, $\frac{\pi}{2}$, $-\sqrt{4}$, $\sqrt{10}$, -6.7.</p>	<p>The concept of integers is applied to problems involving exponents and radicals.</p> <p>Student Edition: 146-149, 149-151, 185-187</p> <p>Teacher Edition: E 185; LQQ 185B; MB 185</p>

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<p>8.1.1.2</p> <p>Compare real numbers; locate real numbers on a number line. Identify the square root of a positive integer as an integer, or if it is not an integer, locate it as a real number between two consecutive positive integers.</p> <p><i>For example:</i> Put the following numbers in order from smallest to largest: 2, $\sqrt{3}$, -4, -6.8, $-\sqrt{37}$.</p> <p><i>Another example:</i> $\sqrt{68}$ is an irrational number between 8 and 9.</p>	<p>Student Edition: 185-187, 194 #19, #20, 325, 326, 331-333 <i>Inquiry</i> 159-161 <i>On Your Own Exercises</i> 196 #43-#44, 198 #51, 337 #2-#10, #19, 338 #19-#20</p> <p>Teacher Edition: E 185; II 159-161; LQQ 185B; MB 185; SP 325B</p>
<p>8.1.1.3</p> <p>Determine rational approximations for solutions to problems involving real numbers.</p> <p><i>For example:</i> A calculator can be used to determine that $\sqrt{7}$ is approximately 2.65.</p> <p><i>Another example:</i> To check that $1\frac{5}{12}$ is slightly bigger than $\sqrt{2}$, do the calculation</p> $\left(1\frac{5}{12}\right)^2 = \left(\frac{17}{12}\right)^2 = \frac{289}{144} = 2\frac{1}{144}.$ <p><i>Another example:</i> Knowing that $\sqrt{10}$ is between 3 and 4, try squaring numbers like 3.5, 3.3, 3.1 to determine that 3.1 is a reasonable rational approximation of $\sqrt{10}$.</p>	<p>Student Edition: 505-507 <i>Explore</i> 185 <i>On Your Own Exercises</i> 515 #7</p> <p>Teacher Edition: E 185B; LQQ 185B; SGI 502B; SP 502B</p>
<p>8.1.1.4</p> <p>Know and apply the properties of positive and negative integer exponents to generate equivalent numerical expressions.</p> <p><i>For example:</i> $3^2 \times 3^{(-5)} = 3^{(-3)} \left(\frac{1}{3}\right)^3 = \frac{1}{27}$.</p>	<p>Student Edition: 146, 146-149, 149-152, 153-155, 156-158 <i>Inquiry</i> 159-161 <i>On Your Own Exercises</i> 162-167</p> <p>Teacher Edition: AE 149, 151; DU 147, 148, 150, 154; E 146B; LQQ 146B; PSP 146B; SGI 146B; SP 146B</p>

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<p>8.1.1.5</p> <p>Express approximations of very large and very small numbers using scientific notation; understand how calculators display numbers in scientific notation. Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation, using the correct number of significant digits when physical measurements are involved.</p> <p><i>For example:</i> $(4.2 \times 10^4) \times (8.25 \times 10^3) = 3.465 \times 10^8$, but if these numbers represent physical measurements, the answer should be expressed as 3.5×10^8 because the first factor, 4.2×10^4, only has two significant digits.</p>	<p>Student Edition: 156-158 <i>Inquiry</i> 159-161 <i>On Your Own Exercises</i> 162 #1, 164-165 #43-#45 <i>Review & Self-Assessment</i> 200 #3-#4</p> <p>Teacher Edition: PSP 146B #9-#10; SP 146B #39-#42; T 158; TD 156</p>
<p>Algebra</p> <p>Understand the concept of function in real-world and mathematical situations, and distinguish between linear and non-linear functions.</p>	
<p>8.2.1.1</p> <p>Understand that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable. Use functional notation, such as $f(x)$, to represent such relationships.</p> <p><i>For example:</i> The relationship between the area of a square and the side length can be expressed as $f(x) = x^2$. In this case, $f(5) = 25$, which represents the fact that a square of side length 5 units has area 25 units squared.</p>	<p>Student Edition: 524-525, 526-528, 528-532, 533-535 <i>On Your Own Exercises</i> 543-546</p> <p>Teacher Edition: I 524; LQQ 524B; SGI 524B; SP 524B; TT 528, 531</p>
<p>8.2.1.2</p> <p>Use linear functions to represent relationships in which changing the input variable by some amount leads to a change in the output variable that is a constant times that amount.</p> <p><i>For example:</i> Uncle Jim gave Emily \$50 on the day she was born and \$25 on each birthday after that. The function $f(x) = 50 + 25x$ represents the amount of money Jim has given after x years. The rate of change is \$25 per year.</p>	<p>Student Edition: 6-9, 10-12, 12-15, 524-525, 526-528 <i>On Your Own Exercises</i> 16-22, 53-54, 541 #3, 542 #9</p> <p>Teacher Edition: AE 15; DU 6, 8; I 524; SGI 4B, 524B; SP 4B, 524B</p>

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<p>8.2.1.3 Understand that a function is linear if it can be expressed in the form $f(x)=mx+b$ or if its graph is a straight line.</p> <p><i>For example:</i> The function $f(x)=x^2$ is not a linear function because its graph contains the points (1,1), (-1,1) and (0,0), which are not on a straight line.</p>	<p>Student Edition: 12-15, 35, 35-38, 38-41, 41-43 <i>On Your Own Exercises</i> 16-22, 53-54, 58 #37-#38</p> <p>Teacher Edition: AE 15; DU 10, 11, 13; SGI 4B; SP 4B; TD 12</p>
<p>8.2.1.4 Understand that an arithmetic sequence is a linear function that can be expressed in the form $f(x)=mx+b$, where $x = 0, 1, 2, 3, \dots$</p> <p><i>For example:</i> The arithmetic sequence 3, 7, 11, 15, ..., can be expressed as $f(x) = 4x + 3$.</p>	<p>Numbers in the rows of the tables represent arithmetic sequences. Linear equations are written for these sequences.</p> <p>Student Edition: 6-7, 10-11, 15, 35-38, 38-41, 44, 48 <i>On Your Own Exercises</i> 16, 18-19</p>
<p>8.1.2.5 Understand that a geometric sequence is a non-linear function that can be expressed in the form $f(x)=ab^x$, where $x = 0, 1, 2, 3, \dots$</p> <p><i>For example:</i> The geometric sequence 6, 12, 24, 48, ... , can be expressed in the form $f(x) = 6(2^x)$.</p>	<p>Student Edition: 169-171, 172-175, 175-178 <i>On Your Own Exercises</i> 179-181 <i>Review & Self-Assessment</i> 202-203 #29-#33</p> <p>Teacher Edition: DU 171; E 169; SGI 169B; SP 169B; TD 172</p>
<p>Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.</p>	
<p>8.2.2.1 Represent linear functions with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another.</p>	<p>Student Edition: 4-5, 6-9, 10-12, 29-30, 35-38, 38-41, 41-43, 43-47, 48-50 <i>On Your Own Exercises</i> 16-19, 21, 22 #12 <i>Review & Self-Assessment</i> 60-61 #1-#8, 62 #16-#17, #22-#23, #30, 63 #32-#35, #37</p> <p>Teacher Edition: AE 9, 15; LQQ 4B; PSP 4B; SGI 4B; SP 4B</p>
<p>8.2.2.2 Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.</p>	<p>Student Edition: 25-28, 29-30, 38-41, 41-43, 44-47, 48-50 <i>Inquiry</i> 51-52 <i>On Your Own Exercises</i> 31-32 <i>Review & Self-Assessment</i> 61-63</p> <p>Teacher Edition: SGI 4B, 24B; SP 24B</p>

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<p>8.2.2.3</p> <p>Identify how coefficient changes in the equation $f(x) = mx + b$ affect the graphs of linear functions. Know how to use graphing technology to examine these effects.</p>	<p>Student Edition: 38-41, 41-43, 66, 67-69 <i>Inquiry</i> 51-52 <i>On Your Own Exercises</i> 79 #1-#5 <i>Review & Self-Assessment</i> 61 #7</p>
<p>8.2.2.4</p> <p>Represent arithmetic sequences using equations, tables, graphs and verbal descriptions, and use them to solve problems.</p> <p><i>For example:</i> If a girl starts with \$100 in savings and adds \$10 at the end of each month, she will have $100 + 10x$ dollars after x months.</p>	<p>Student Edition: 6-9, 10-12 <i>On Your Own Exercises</i> 16-19</p> <p>Teacher Edition: LQQ 4B; PSP 4B; SGI 4B; SP 4B</p>
<p>8.2.2.5</p> <p>Represent geometric sequences using equations, tables, graphs and verbal descriptions, and use them to solve problems.</p> <p><i>For example:</i> If a girl invests \$100 at 10% annual interest, she will have $100(1.1^x)$ dollars after x years.</p>	<p>Student Edition: 169-171, 172-175, 175-178 <i>Explore</i> 169 <i>On Your Own Exercises</i> 179-181 <i>Review & Self-Assessment</i> 202-203 #29-33</p> <p>Teacher Edition: SGI 169B; SP 169B</p>
<p>Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.</p>	
<p>8.2.3.1</p> <p>Evaluate algebraic expressions, including expressions containing radicals and absolute values, at specified values of their variables.</p> <p><i>For example:</i> Evaluate $\pi r^2 h$ when $r = 3$ and $h = 0.5$, and then use an approximation of π, to obtain an approximate answer.</p>	<p>Student Edition: 188-189, 210-213, 216-218, 629 <i>Inquiry</i> 214-215 <i>On Your Own Exercises</i> 220-221 #15-#19</p>
<p>8.2.3.2</p> <p>Justify steps in generating equivalent expressions by identifying the properties used, including the properties of algebra. Properties include the associative, commutative and distributive laws, and the order of operations, including grouping symbols.</p>	<p>Student Edition: 206-207, 207-209 <i>On Your Own Exercises</i> 219, 220 #9-#14, 221 #26-#30</p> <p>Teacher Edition: OSA 209; T 209</p>

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Represent real-world and mathematical situations using equations and inequalities involving linear expressions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.

8.2.4.1

Use linear equations to represent situations involving a constant rate of change, including proportional and non-proportional relationships.

For example: For a cylinder with fixed radius of length 5, the surface area $A = 2\pi(5)h + 2\pi(5)^2 = 10\pi h + 50\pi$, is a linear function of the height h , but it is not proportional to the height.

Student Edition:

4-5, 6-9, 10-12, 12-15

On Your Own Exercises 16-17, 18-19 #7, 21, 22 #12

Teacher Edition:

PSP 4B; SGI 4B; SP 4B

8.2.4.2

Solve multi-step equations in one variable. Solve for one variable in a multi-variable equation in terms of the other variables. Justify the steps by identifying the properties of equalities used.

For example: The equation $10x + 17 = 3x$ can be changed to $7x + 17 = 0$, and then to $7x = -17$ by adding/subtracting the same quantities to both sides. These changes do not change the solution of the equation.

Another example: Express the radius of a circle in terms of its circumference.

Student Edition:

312, 312-316, 317-321

On Your Own Exercises 322

Teacher Edition:

AE 315; E 312B; LQQ 312B; PSP 312B; SGI 312B; SP 312B; TD 312

8.2.4.3

Express linear equations in slope-intercept, point-slope and standard forms, and convert between these forms. Given sufficient information, find an equation of a line.

For example: Determine an equation of the line through the points $(-1,6)$ and $(2/3, -3/4)$.

Student Edition:

38-41, 41-43, 44-47, 48-50

On Your Own Exercises 53, 54 #10-#15, 55 #16-#18, #22-#24, 58 #37-#38

Review & Self-Assessment 62 #16-#17, #23, 63 #38-#41

Test-Taking Practice 63 #5

Teacher Edition:

AE 45, 47

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<p>8.2.4.4</p> <p>Use linear inequalities to represent relationships in various contexts.</p> <p><i>For example:</i> A gas station charges \$0.10 less per gallon of gasoline if a customer also gets a car wash. Without the car wash, gas costs \$2.79 per gallon. The car wash is \$8.95. What are the possible amounts (in gallons) of gasoline that you can buy if you also get a car wash and can spend at most \$35?</p>	<p>Student Edition: 326-328, 328-330, 331-333 <i>On Your Own Exercises</i> 337 #11-#12, 339 #31-#32 <i>Review & Self-Assessment</i> 367 #6, 368 #7, #10, 370 #32 <i>Test-Taking Practice</i> 371 #1</p> <p>Teacher Edition: E 326B; LQQ 325B; PSP 325B</p>
<p>8.2.4.5</p> <p>Solve linear inequalities using properties of inequalities. Graph the solutions on a number line.</p> <p><i>For example:</i> The inequality $-3x < 6$ is equivalent to $x > -2$, which can be represented on the number line by shading in the interval to the right of -2.</p>	<p>Student Edition: 328-330, 331-333 <i>On Your Own Exercises</i> 337 #13-#18, 338 #19-#20, 340 #37 <i>Review & Self-Assessment</i> 367 #6, 368 #7, #10, 369 #14-#18, 370 #30-#31 <i>Test-Taking Practice</i> 371 #12</p> <p>Teacher Edition: LQQ 325B; SGI 325B; SP 325B; T 330</p>
<p>8.2.4.6</p> <p>Represent relationships in various contexts with equations and inequalities involving the absolute value of a linear expression. Solve such equations and inequalities and graph the solutions on a number line.</p> <p><i>For example:</i> A cylindrical machine part is manufactured with a radius of 2.1 cm, with a tolerance of $\frac{1}{100}$ cm. The radius r satisfies the inequality $r - 2.1 \leq .01$.</p>	<p>Absolute value inequalities are solved, compared and/or graphed on a number line:</p> <p>Student Edition: 332 #4, #6-#9 <i>On Your Own Exercises</i> 337 #8-#10 <i>Review & Self-Assessment</i> 370 #31 <i>Share & Summarize</i> 333 #3</p>
<p>8.2.4.7</p> <p>Represent relationships in various contexts using systems of linear equations. Solve systems of linear equations in two variables symbolically, graphically and numerically.</p> <p><i>For example:</i> Marty's cell phone company charges \$15 per month plus \$0.04 per minute for each call. Jeannine's company charges \$0.25 per minute. Use a system of equations to determine the advantages of each plan based on the number of minutes used.</p>	<p>Student Edition: 342-343, 343-345, 346-348, 349-351, 352-355 <i>On Your Own Exercises</i> 361-364, 365 #20-#22, 366 #24 <i>Review & Self-Assessment</i> 369 #25, 370 #26-#29 <i>Test-Taking Practice</i> 371 #5</p> <p>Teacher Edition: AE 348, 350; E 342B; LQQ 342B; OSA 354; QQ 366 #2; SGI 342B; SP 342B</p>

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<p>8.2.4.8</p> <p>Understand that a system of linear equations may have no solution, one solution, or an infinite number of solutions. Relate the number of solutions to pairs of lines that are intersecting, parallel or identical. Check whether a pair of numbers satisfies a system of two linear equations in two unknowns by substituting the numbers into both equations.</p>	<p>Student Edition: 343-345 <i>On Your Own Exercises</i> 361 #1 <i>Share & Summarize</i> 345 #2, 355 #3</p> <p>Teacher Edition: S&S 345, 355</p>
<p>8.2.4.9</p> <p>Use the relationship between square roots and squares of a number to solve problems.</p> <p><i>For example:</i> If $\pi x^2 = 5$, then $x = \sqrt{\frac{5}{\pi}}$, or equivalently, $x = \sqrt{\frac{5}{\pi}}$ or $x = -\sqrt{\frac{5}{\pi}}$. If x is understood as the radius of a circle in this example, then the negative solution should be discarded and $x = \sqrt{\frac{5}{\pi}}$.</p>	<p>Student Edition: <i>Develop & Understand:C</i> 187 <i>On Your Own Exercises</i> 195 #13-#20 <i>Mixed Review</i> 389 #19-#24 <i>Review & Self-Assessment</i> 202 #9</p>
Geometry & Measurement	
Solve problems involving right triangles using the Pythagorean Theorem and its converse.	
<p>8.3.1.1</p> <p>Use the Pythagorean Theorem to solve problems involving right triangles.</p> <p><i>For example:</i> Determine the perimeter of a right triangle, given the lengths of two of its sides.</p> <p><i>Another example:</i> Show that a triangle with side lengths 4, 5 and 6 is not a right triangle.</p>	<p>See <i>Math Connects: Concepts, Skills, and Problem Solving, Course 3</i> © 2009.</p> <p>Student Edition: 162-166, 167-171, 173-178 <i>Geometry Lab</i> 161 <i>Study Guide and Review</i> 181-182 <i>Practice Test</i> 183</p> <p>Teacher Edition: 162b A 166; AE 163-164, 168; DI 164; FMC 163, 168; PAA 163, 168; SQ 162, 167; TNT 164, 169</p>
<p>8.3.1.2</p> <p>Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system.</p>	<p>See <i>Math Connects: Concepts, Skills, and Problem Solving, Course 3</i> © 2009.</p> <p>Student Edition: 173-178 <i>Study Guide and Review</i> 182 <i>Practice Test</i> 183</p> <p>Teacher Edition: A 178; AE 174-175; FMC 175; PAA 175; SQ 173</p>

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<p>8.3.1.3</p> <p>Informally justify the Pythagorean Theorem by using measurements, diagrams and computer software.</p>	<p>See <i>Math Connects: Concepts, Skills, and Problem Solving, Course 3</i> © 2009.</p> <p>Student Edition: 162-166, 167-171, 173-178 <i>Geometry Lab</i> 161 <i>Study Guide and Review</i> 181-182 <i>Practice Test</i> 183</p> <p>Teacher Edition: 162b</p> <p>A 166; AE 163-164, 168; DI 164; FMC 163, 168; PAA 163, 168; SQ 162, 167; TNT 164, 169</p>
<p>Solve problems involving parallel and perpendicular lines on a coordinate system.</p>	
<p>8.3.2.1</p> <p>Understand and apply the relationships between the slopes of parallel lines and between the slopes of perpendicular lines. Dynamic graphing software may be used to examine the relationships between lines and their equations.</p>	<p>Student Edition: 66, 67, 344 #4-#6 <i>Inquiry</i> 51-52 <i>On Your Own Exercises</i> 58 #38, 79 #1-#5 <i>Share & Summarize</i> 69 #1, 345 #2</p> <p>Teacher Edition: TT 67</p>
<p>8.3.2.2</p> <p>Analyze polygons on a coordinate system by determining the slopes of their sides.</p> <p><i>For example:</i> Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram.</p>	<p>See <i>Math Connects: Concepts, Skills, and Problem Solving, Course 3</i> © 2009.</p> <p>Student Edition: <i>Geometry Lab</i> 493</p>
<p>8.3.2.3</p> <p>Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically.</p>	<p>Student Edition: 67</p>
<p>Data Analysis & Probability</p>	
<p>Interpret data using scatterplots and approximate lines of best fit. Use lines of best fit to draw conclusions about data.</p>	
<p>8.4.1.1</p> <p>Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit and determine an equation for the line. Use appropriate titles, labels and units. Know how to use graphing technology to display scatterplots and corresponding lines of best fit.</p>	<p>Student Edition: 74-78 <i>On Your Own Exercises</i> 81-82 #14-#15, 86 #34 <i>Review & Self-Assessment</i> 107 #2</p> <p>Teacher Edition: LQQ 66B; PSP 66B; SP 66B; T 77</p>

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<p>8.4.1.2 Use a line of best fit to make statements about approximate rate of change and to make predictions about values not in the original data set.</p> <p><i>For example:</i> Given a scatterplot relating student heights to shoe sizes, predict the shoe size of a 5'4" student, even if the data does not contain information for a student of that height.</p>	<p>Student Edition: 74-78 <i>On Your Own Exercises</i> 81 #14c, 82 #15d <i>Review & Self-Assessment</i> 107 #2d</p> <p>Teacher Edition: PSP 66B; #3b; SP 66B #13d</p>
<p>8.4.1.3 Assess the reasonableness of predictions using scatterplots by interpreting them in the original context.</p> <p><i>For example:</i> A set of data may show that the number of women in the U.S. Senate is growing at a certain rate each election cycle. Is it reasonable to use this trend to predict the year in which the Senate will eventually include 1000 female Senators?</p>	<p>Student Edition: 74-78 <i>On Your Own Exercises</i> 82 #15e-15f</p>
<p>9.2.1.1 Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain.</p>	<p>Student Edition: 524-525, 526-528, 528-532, 533-534 <i>On Your Own Exercises</i> 540-546 <i>Review & Self-Assessment</i> 572-574 <i>Test-Taking Practice</i> 575</p> <p>Teacher Edition: E 524B; LQQ 524B; OSA 530, 535; PSP 524B; SGI 524B; SP 524B</p>
<p>9.2.1.2 Distinguish between functions and other relations defined symbolically, graphically or in tabular form.</p>	<p>Student Edition: 524-525, 526-528, 530 #5 <i>On Your Own Exercises</i> 542, 544 #18</p> <p>Teacher Edition: E 524B</p>
<p>9.2.1.3 Find the domain of a function defined symbolically, graphically or in a real-world context.</p>	<p>Student Edition: 531-532 <i>On Your Own Exercises</i> 543 #14d-17</p> <p>Teacher Edition: MB 532; RAL 531</p>

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<p>9.2.1.4 Obtain information and draw conclusions from graphs of functions and other relations.</p>	<p>Student Edition: 375-378, 533-535, 535-538 <i>Connect & Extend</i> 568 #31, 569 #36 <i>Inquiry</i> 538-539 <i>On Your Own Exercises</i> 383 #1-#2, 386-388, 545 #23, 546</p> <p>Teacher Edition: LQQ 374B; PSP 374B; SGI 374B; SP 374B</p>
<p>9.2.1.5 Identify the vertex, line of symmetry and intercepts of the parabola corresponding to a quadratic function, using symbolic and graphical methods, when the function is expressed in the form $f(x) = ax^2 + bx + c$, in the form $f(x) = a(x - h)^2 + k$, or in factored form.</p>	<p>Student Edition: 375-378, 391-393, 403, 404-407, 407-409 <i>Connect & Extend</i> 400 <i>On Your Own Exercises</i> 383, 384 #9</p> <p>Teacher Edition: RAL 409; SP 403B</p>
<p>9.2.1.6 Identify intercepts, zeros, maxima, minima and intervals of increase and decrease from the graph of a function.</p>	<p>Student Edition: 375-378, 410-412 <i>On Your Own Exercises</i> 383 #1, 421 #13</p> <p>Teacher Edition: E 374B; LQQ 374B; SGI 374B; SP 374B; T 378</p>
<p>9.2.1.7 Understand the concept of an asymptote and identify asymptotes for exponential functions and reciprocals of linear functions, using symbolic and graphical methods.</p>	<p>The concept of an asymptote is applied to graphs in the following references.</p> <p>Student Edition: <i>Connect & Extend</i> 443 #19e-19f <i>Share & Summarize</i> 178, 432 <i>Think & Discuss</i> 437</p> <p>Teacher Edition: S&S 178, 432; TD 437</p>
<p>9.2.1.8 Make qualitative statements about the rate of change of a function, based on its graph or table of values.</p>	<p>Student Edition: 25-28, 29-30, 35-38, 38-40, 41-43, 44-47 <i>On Your Own Exercises</i> 31-33</p> <p>Teacher Edition: SGI 24B; SP 24B</p>
<p>9.2.1.9 Determine how translations affect the symbolic and graphical forms of a function. Know how to use graphing technology to examine translations.</p>	<p>Student Edition: 407-409 <i>Explore</i> 66 <i>Inquiry</i> 51-52, 416-417 <i>On Your Own Exercises</i> 418 #2-#5, 419-420 <i>Think & Discuss</i> 404</p> <p>Teacher Edition: C 404; E 403B; LQQ 403B</p>

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<p>Recognize linear, quadratic, exponential and other common functions in real-world and mathematical situations; represent these functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions, and explain results in the original context.</p>	
<p>9.2.2.1 Represent and solve problems in various contexts using linear and quadratic functions.</p>	<p>Student Edition: 6-9, 10-11, 317-321, 375-378, 410-412, 505-507, 533-534 <i>Inquiry</i> 538-539 <i>On Your Own Exercises</i> 16-22, 383 #1-#2, 385-387, 515 #7, #11, 517 #19 Teacher Edition: AE 9; PSP 4B, 374B, 502B; SGI 374B; SP 374B</p>
<p>9.2.2.2 Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.</p>	<p>Student Edition: 169, 169-171; 172-175, 175-178 <i>On Your Own Exercises</i> 179-183 <i>Review & Self-Assessment</i> 201 #5-#7 Teacher Edition: PSP 169B; SGI 169B; SP 169B</p>
<p>9.2.2.3 Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.</p>	<p>Student Edition: 41-43, 69-70, 169-171, 374, 375-378, 391-393, 404-407, 407-409, 410-412 <i>Inquiry</i> 51-52, 71-73, 416-417 <i>On Your Own Exercises</i> 58 #37-#38, 181 #14, 383 #1-#2, 386, 398-401, 402 #9, #11 <i>Review & Self-Assessment</i> 63 #32-#37 Teacher Edition: AE 393; E 403B; LQQ 403B; QQ 402; SGI 403B; SP 403B</p>

STANDARDS	PAGE REFERENCES
<p>9.2.2.4</p> <p>Express the terms in a geometric sequence recursively and by giving an explicit (closed form) formula, and express the partial sums of a geometric series recursively.</p>	<p>Lesson 4.2 (169-184) can be used to meet this objective. This lesson introduces exponential relationships and the tables of values represent geometric sequences. Corresponding formulas/equations are written in explicit form, letting x represent the term number and y represent the nth term.</p> <p>In the lesson, students are asked to identify an exponential equation from a choice of a linear, power, or exponential equation. They are asked to determine which equation fits each given scenario. Students are also asked to write exponential equations from tables of values. Finally, students compare growth and decay models, including matching graphs to the formulas. Since both growth and decay models are included, common ratios greater than 1 and common ratios between 0 and 1 are used.</p>
<p>9.2.2.5</p> <p>Recognize and solve problems that can be modeled using finite geometric sequences and series, such as home mortgage and other compound interest examples. Know how to use spreadsheets and calculators to explore geometric sequences and series in various contexts.</p>	<p>Exponential relationships are explored and can be defined as geometric sequences.</p> <p>Student Edition: 169-171, 172-175, 175-178 <i>Explore</i> 169 <i>On Your Own Exercises</i> 179-181 <i>Review & Self-Assessment</i> 202-203 #29-#33</p> <p>Teacher Edition: SGI 169B; SP 169B</p>
<p>9.2.2.6</p> <p>Sketch the graphs of common non-linear functions such as $f(x)=\sqrt{x}$, $f(x)= x$, $f(x)=\frac{1}{x}$, $f(x)=x^3$, and translations of these functions, such as $f(x)=\sqrt{x-2}+4$. Know how to use graphing technology to graph these functions.</p>	<p>Student Edition: 408-409, 413-415, 430-432, 432-435, 436-439, 533-535 <i>Explore</i> 428-429 <i>Inquiry</i> 416-417, 538-539 <i>On Your Own Exercises</i> 418 #2-#5, 420 #12, 422 #25, 440-445 <i>Mixed Review</i> 549 #39-#41</p> <p>Teacher Edition: E 403B; QQ 427</p>

STANDARDS	PAGE REFERENCES
<p style="text-align: center;">Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.</p>	
<p>9.2.3.1 Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.</p>	<p>Student Edition: 379-382, 404-405, 430-432, 434-435 <i>On Your Own Exercises</i> 384, 440 <i>Think & Discuss</i> 404 Teacher Edition: SGI 428B</p>
<p>9.2.3.2 Add, subtract and multiply polynomials; divide a polynomial by a polynomial of equal or lower degree.</p>	<p>Student Edition: 225-227, 227-228, 229-231, 231-233, 234-236, 244-246, 247-249 <i>Explore</i> 244 <i>On Your Own Exercises</i> 237-242, 250-252 <i>Review & Self-Assessment</i> 254-256 <i>Test-Taking Practice</i> 257 Teacher Edition: AE 233; E 244B; LQQ 224B; 244B; MB 224; OSA 227; PSP 224B; 244B; SGI 224B; 244B; SP 224B; 244B; TT 231</p>
<p>9.2.3.3 Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares.</p>	<p>Student Edition: 476-477, 478-480, 481-483, 484-486 <i>On Your Own Exercises</i> 487-490 <i>Review & Self-Assessment</i> 519 #6-#11, 520 #17-#22 Teacher Edition: AE 483; LQQ 476B; OSA 486; PSP 476B; QQ 491; RAL 476, 483; SGI 476B; SP 476B</p>
<p>9.2.3.4 Add, subtract, multiply, divide and simplify algebraic fractions.</p>	<p>Algebraic fractions are added or subtracted. Student Edition: 640-641, 642-645, 648-650 <i>Inquiry</i> 646-647 <i>On Your Own Exercises</i> 651-653 <i>Review & Self-Assessment</i> 656 #20-#37 Teacher Edition: AE 641, LQQ 639B; PSP 639B; SGI 639B; SP 639B</p>
<p>9.2.3.5 Check whether a given complex number is a solution of a quadratic equation by substituting it for the variable and evaluating the expression, using arithmetic with complex numbers.</p>	<p>Complex numbers are introduced. Student Edition: 186 #9 Teacher Edition: DU 186 #9</p>

STANDARDS	PAGE REFERENCES
<p>9.2.3.6 Apply the properties of positive and negative rational exponents to generate equivalent algebraic expressions, including those involving n^{th} roots.</p>	<p>Positive and negative integer exponents are evaluated. Student Edition: 146-148, 149-152</p>
<p>9.2.3.7 Justify steps in generating equivalent expressions by identifying the properties used. Use substitution to check the equality of expressions for some particular values of the variables; recognize that checking with substitution does not guarantee equality of expressions for all values of the variables.</p>	<p>Student Edition: 206-207, 207-209, 210-213 <i>On Your Own Exercises</i> 219, 220 #9-#14, 221 #26-#30</p>
<p>Represent real-world and mathematical situations using equations and inequalities involving linear, quadratic, exponential, and n^{th} root functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.</p>	
<p>9.2.4.1 Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.</p>	<p>Student Edition: 476-477, 478-480, 481-483, 484-486, 493-495, 495-497, 503-504, 505-507 <i>On Your Own Exercises</i> 487-490, 498-500, 515-517 Teacher Edition: LQQ 476B, 492B, 502B; OSA 510; PSP 476B, 492B, 502B; QQ 491, 501; SGI 476B, 492B, 502B; SP 476B, 492B, 502B</p>
<p>9.2.4.2 Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations</p>	<p>Student Edition: 169-171, 172-175, 175-178 <i>On Your Own Exercises</i> 179-183 <i>Review & Self-Assessment</i> 201 #5-#7, 202-203 #29-#33 Teacher Edition: PSP 169; SGI 169; SP 169</p>
<p>9.2.4.3 Recognize that to solve certain equations, number systems need to be extended from whole numbers to integers, from integers to rational numbers, from rational numbers to real numbers, and from real numbers to complex numbers. In particular, non-real complex numbers are needed to solve some quadratic equations with real coefficients.</p>	<p>Student Edition: 484-486, 492-493, 496-497, 503-504, 505-507, 508-510 <i>On Your Own Exercises</i> 488 #25-#36, 498 #1-#8, #19-#28, 515-516 <i>Review & Self-Assessment</i> 519 #6-#11, 520 #28-#37 Teacher Edition: OSA 486, 510; QQ 491, 501, 518; SGI 476B, 492B; SP 476B, 492B</p>

STANDARDS	PAGE REFERENCES
<p>9.2.4.4 Represent relationships in various contexts using systems of linear inequalities; solve them graphically. Indicate which parts of the boundary are included in and excluded from the solution set using solid and dotted lines.</p>	<p>Student Edition: 336 #17 Teacher Edition: E 325B</p>
<p>9.2.4.5 Solve linear programming problems in two variables using graphical methods.</p>	<p>Teacher Edition: E 325B</p>
<p>9.2.4.6 Represent relationships in various contexts using absolute value inequalities in two variables; solve them graphically.</p>	<p>See <i>Math Connects: Concepts, Skills, and Problem Solving, Course 3</i> © 2009. Student Edition: 35-36</p>
<p>9.2.4.7 Solve equations that contain radical expressions. Recognize that extraneous solutions may arise when using symbolic methods.</p>	<p>Student Edition: 471 #5, 492 <i>On Your Own Exercises</i> 473 #1-#6 <i>Review & Self-Assessment</i> 519 #2, #4 <i>Test-Taking Practice</i> 521 #6 Teacher Edition: E 466B; LQQ 466B #2a, SP 466B #1-#3, #6, #16</p>
<p>9.2.4.8 Assess the reasonableness of a solution in its given context and compare the solution to appropriate graphical or numerical estimates; interpret a solution in the original context.</p>	<p>Student Edition: 376 #2, 485 #7, 505-507 <i>Inquiry</i> 511-512 <i>On Your Own Exercises</i> 490 #48</p>

Codes Used for Teacher Edition pages

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AE	Additional Examples
C	Connections
DU	Develop & Understand
E	Explore
I	Introduce
LQQ	Lesson Quick Quiz
MB	Mathematical Background
OSA	On the Spot Assessment
PSP	Problem Solving Practice
QQ	Quick Quiz
RAL	Reaching All Learners
S&S	Share & Summarize
SGI	Study Guide Intervention
SP	Skills Practice
T	Troubleshooting
TD	Think & Discuss
TT	Teacher Tips

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A	Assess
AE	Additional Examples
DI	Differentiated Instruction
FMC	Focus on Mathematical Concept
PAA	Pre-AP Activity
SQ	Scaffolding Questions
TNT	Tips for New Teachers